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IS 14940 (2001): Carbosulfan, Technical - Specificaiton
[FAD 1: Pesticides and Pesticides Residue Analysis]

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भारतीय मानक

कार्बोसल्फेन तकनीकी — विशिष्टि

Indian Standard

CARBOSULFAN TECHNICAL — SPECIFICATION

ICS 19.020, 65.100.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 2001

Price Group 2

Pesticides Sectional Committee, FAD 1

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides Sectional Committee had been approved by the Food and Agriculture Division Council.

Carbosulfan, Technical is used in insecticidal formulations.

Carbosulfan is the common name accepted by the International organization for standardization (ISO) for 2, 3-dihydro-2, 2-dimethyl-7 benzofuranyl [dibutylamino-thio] methyl carbamate.

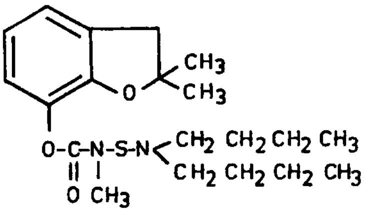
Empirical Formula	Structural Formula	Molecular weight
$C_{20}H_{32}N_2O_3S$		380.5

FIG. 1 STRUCTURAL FORMULA

In the preparation of this standard, due consideration has been given to the provisions of the *Insecticides Act*, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under the Act and Rules wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CARBOSULFAN TECHNICAL — SPECIFICATION

1 SCOPE

The standard prescribes the requirements and the methods of sampling and test for carbosulfan technical.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicted below:

IS No.	*Title*
1070 : 1992	Reagent grade water (*third revision*)
6940 : 1982	Method of test for pesticides : Part 1 Solid pesticides (*second revision*)
1783 : 1990	'A' grade mild steel drums
8190 (Part 2) : 1988	Requirement for packing of pesticides: Part 2 Liquid pesticides (*second revision*)
10946 : 1996	Methods of sampling for technical grade pesticides (*first revision*)

3 REQUIREMENTS

3.1 Description

The material shall be in the form of a viscos brown liquid, free from extraneous matter.

3.2 The material shall also comply with the requirements given in Table 1.

4 PACKING

The material shall be packed in mild steel drums (*see* IS 1783) containers with LDPE liner of thickness not less than 0.062 mm. The container shall also comply with the general requirements as specified in **2** of IS 8190 (Part 2).

5 MARKING

5.1 The containers shall bear legibly and indelibly the following information in addition to any other information as required under the *Insecticides Act*, 1968 and Rules:

a) Name of the material;

b) Name and address of the manufacturer;

c) Batch number;

d) Date of manufacture;

e) Date of expiry;

f) Carbosulfan content, percent (*m/m*);

g) Net mass of the contents; and

h) Any other information required under the *Insecticides Act*, 1968 and Rules framed thereunder and *Standards of Weights and Measures (Packaged Commodities) Rules*, 1977.

5.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

5.2.1 The use of the Standard Mark is goverened by

Table 1 Requirements for Carbosulfan Technical

Sl No.	Characteristic	Requirement	Methods of Test, Ref to	
			Annex of this Standard	Cl No. of IS 6940
(1)	(2)	(3)	(4)	(5)
i)	Carbosulfan content, percent by mass, *Min*	92.0	A	—
ii)	Material insoluble in acetone percent by mass, *Max*	0.2	—	9.1
iii)	Moisture content, percent by mass, *Max*	0.5	—	4
iv)	Acidity (as H_2SO_4), percent by mass, *Max*	1.0	—	11.3

The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

6.1 Representative samples of the material shall be drawn according to IS 10946.

7.1 Tests shall be carried out by the methods referred to in col 4 and 5 of Table 1.

7.2 Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

> NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

ANNEX A

[*Table* 1, *Sl No.* (i)]

DETERMINATION OF CARBOSULFAN CONTENT

A-0 METHOD

Two methods namely infra-red spectrophotometric method and liquid chromatographic method for the determination of carbosulfan content have been prescribed. However, the liquid chromatography method is considered as referee method.

A-1 INFRA-RED SPECTROPHOTOMETRIC METHOD

A-1.1 Principle

The analytical method is intended for the quantitative determination of carbosulfan content in the samples based on absorbance values measured in a infra-red spectrophotometer.

A-1.2 Apparatus

A-1.2.1 *Infra-red (IR) Spectrophotometer*

A double beam IR Spectrophotometer equipped with printer-plotter-cum-integrator is used for this determination. The suggested operative parameters are as follows, but can be changed if necessary, provided standardization is done:

Wave number range : 1 350 cm^{-1} – 1 250 cm^{-1}

Absorption wave number : 1 300 cm^{-1}

Chart expansion : 0.5

Ordinate expansion : 6.00

Chart speed : 12 min - full scan

A-1.2.2 *Cells, 0.1 mm Sodium Chloride, Matched Pair*

A-1.3 Reagents

A-1.3.1 *Tetrachloroethylene* — AR grade.

A-1.3.2 *Standard Carbosulfan* — of known purity.

A-1.4 Procedure

A-1.4.1 *Preparation of Standard Solution*

Weigh accurately 0.5 gm of standard carbosulfan in a 50-ml volumetric flask. Dissolve in tetrachloroethylene and make up the solution volume up to the mark.

A-1.4.2 *Preparation of Sample Solution*

Weigh accurately a quantity of the sample equivalent to 0.5 g of carbosulfan in a 50-ml standard volumetric flask. Dissolve in tetrachloroethylene and make up the solution volume up to the mark. Before measuring the absorbance of sample solution of carbosulfan DS formulation.

A-1.4.3 *Estimation*

Read absorbance of standard as well as sample solutions by taking tetrachloroethylene in a reference cell.

A-1.5 Calculation

$$\text{Carbosulfan content percent } w/w = \frac{W_1}{W_2} \times \frac{A_2}{A_1} \times P$$

where

W_1 = weight of standard carbosulfan,

W_2 = weight of sample carbosulfan,

A_1 = absorbance of carbosulfan in standard,

A_2 = absorbance of carbosulfan in sample, and

P = percent *w/w* purity of carbosulfan standard.

content of carbosulfan in the sample is calculated using standard carbosulfan of known purity.

A-2.2 Apparatus

A-2.2.1 *High Performance Liquid Chromatograph*

A high performance liquid chromatograph with ultra-violet (UV) detector and PC based data system is used for this determination. The suggested operative parameters are as follows, but can be changed if necessary, provided standardization is done:

Column	:	Inertsih ODS-3V, C-18, 250 mm long × 4.5 mm i.d.; S.S. or any other equivalent ODS (C-18) column
Mobile phase	:	Methanol + Water (80 + 20 *v/v*)
Flow rate	:	1.5 ml/min
Wave length	:	280 nm
Sensitivity	:	0.04 AUFS
Injection Volume	:	20 µl
Retention time	:	Carbosulfan (a.i.) : 7.8 min (approx.) Di-n-butylphthalate (Internal standard) : 3.9 min (approx.)

NOTE — The AUFS value has to be adjusted for obtaining peaks at 60-80 percent of full scale.

A-2.2.2 *Microlitre Syringe*

A-2.3 Reagents

A-2.3.1 *Internal Standard, Di-n-butylphthalate*

A-2.3.2 *Methanol* — HPLC grade.

A-2.3.3 *Water* — HPLC grade.

A-2.4 Procedure

A-2.4.1 *Preparation of Internal Standard Solution*

solution (**A-2.4.1**) and then make up the volume with methanol.

A-2.4.3 *Preparation of Sample Solution*

Weigh accurately a quantity of sample equivalent to 0.05 g of carbosulfan into a 50-ml volumetric flask, add 5 ml of internal standard solution (**A-2.4.1**) and then make up the solution volume with methanol. Filter the sample through 0.2 µm filter disc, if required.

A-2.4.4 *Estimation*

Successively inject 20 microlitre each of standard and sample solutions and measure the areas of carbosulfan and internal standard peaks in respective chromatograms.

NOTE — Example chromatograms of HPLC analysis are enclosed.

A-2.5 Calculation

For each injection

$$\text{Response Ratio } (R) = \frac{\text{Carbosulfan Peak Area}}{\text{Internal Standard (DBP) Peak Area}}$$

$$\text{Carbosulfan content percent } m/m = \frac{R_2}{R_1} \times \frac{W_1}{W_2} \times P$$

where

R_1 = average response ratio of standard solution,

R_2 = response ratio of sample solution,

W_1 = weight of standard carbosulfan (g),

W_2 = weight of sample, and

P = percent purity of standard carbosulfan used.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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